Mathematical Methods for Engineers II

Syllabus

Subject Name	Mathematical Methods for Engineers II			
Subject Code	EE203			
Status	Minor			
Credit Hours	3			
Semester / Year	1-2			
Pre-requisite	Calculus & analytical geometry-II, Mathematics for engineers-I			
Teaching Method	Lectures			
Assessment				
.Tests	20%			
Mid term examination	20%			
Assignments	10%			
Final Examination	50%			
The course has five assessment components as described above. Test 1: it will be conducted on week 5 of the semester. The test 1 will usually have 4 questions of approximately 15 minutes duration each. Midterm exam: it will be conducted on week 9 of the semester. The midterm exam will have 4 questions of approximately 20 minutes duration each. Test 2: will be conducted on week 12 of the semester. The test 2 will usually have 4 questions of approximately 15 minutes duration each. Laboratory component: it is compulsory to attend all the lab sessions; failing to do so will result in complete failure in the subject. The student will carry out the experiments described below and submit a report to the lab tutor at the end of the semester. Final Exam component: it will consist of 5 questions of 3 hours duration				
40% ruling:		Applicable		
Supplementary examination		Applicable on the final exam only		
Lecturer				

Objectives	This unit aims to: ➢ Introduce the students to ordinary differential equations. ➢ Introduce the students to power series and their application in solving linear differential equations. ➢ Develop a solid understanding of transform and its use in solving linear differential equations. ➢ Develop a solid background of Fourier series and its application in solving partial differential equations.			
Learning Outcome	The student will be able to: ➢ Solve ordinary differential equations. ➢ Apply transforms to solve Differential equations. ➢ Apply Fourier series to solve partial differential equations. ➢ Use partial differentiation to solve engineering applications. ➢ Use power series to solve ordinary differential equations.			
Syllabus & Contact Hours	Main Core of Module:	Contact Hours	Tutorials	Laboratory
	1. Ordinary Differential Equations ▪ Separable and linear first-order equations ▪ Second-order equations reducible to first-order ▪ Linear n^{th} -order equations ▪ Homogeneous equations ▪ Non-homogeneous equations	9		

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Syllabus & Contact Hours	2. Series Solutions of Ordinary Differential Equations ▪ Power series solutions, ordinary and singular points ▪ Introduction to Frobenius solutions	9		
	3. Fourier Series and Partial Differential Equations ▪ Fourier, Fourier cosine and Fourier sine series and their properties ▪ Introduction to heat, vibration and potential equations with boundary and/or initial conditions ▪ Linearity, superposition and separation of variables ▪ Solution of homogeneous and non homogeneous problems by separation of variables and eigen-function expansions	12		
	4. Laplace Transforms ▪ Definition and lagebraic properties ▪ Solution of differential equations ▪ Application to step functions and delta functions	12		
	Total Hours	42		

Textbook	ADVANCED ENGINEERING MATHEMATICS, 9TH ED., by Kreyszig. John Wiley.
Reference Books	THOMA'S CALCULUS 11TH ED, by Weir, Hass, Giordano. Addison Wesley Elementary Differential Equations 7^{th} Ed, by Boyce DiPrima, John Wiley.
Laboratory Session (if any)	None

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